STATISTICS BOTSWANA

INDEX OF THE PHYSICAL VOLUME OF MINING PRODUCTION

Third Quarter 2018 Stats Brief

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1.0 Preface

This statistical release presents quarterly Index of Mining Production (IMP) for the period 2012 to the third quarter of 2018. Also carried in the report are the annual IMP for the period 2012 to 2017, derived as the average of the four quarters of the year. This report uses 2013 as a reference year. Data used in this publication are sourced from the Department of Mines under the Ministry of Mineral Resources, Green Technology and Energy Security.

The Index of Mining Production stood at 87.1 during the third quarter of 2018, showing a year-on-year decrease of 4.2 percent from 91.0 during the third quarter of 2017. Comparison on quarter-on-quarter shows a decrease of 7.4 percent from the index of 94.0 realised during the second quarter of 2018 to 87.1 during the third quarter of the same year.

The release further shows the contribution of each mineral and mineral group to the Year-on-Year Percentage Change in the Volume of Mining Production, and hence provides a reflection of the trend in the local mining sector.

Statistics Botswana is mandated to compile data on industrial production in Botswana, hence index of mining production is only confined to minerals extracted across the country. This is intended to monitor the performance of the mining sector in Botswana.

For more information, contact the Directorate of Stakeholder Relations on (+267) 3671300. All Statistics Botswana outputs/publications are available on the website at www.statsbots.org.bw and at the Statistics Botswana Information Resource Centre.

I sincerely thank all stakeholders involved in the formulation of this brief, for their continued support, as we strive to better serve users of Statistics Botswana products and services.

Dr Burton S. Mguni
Statistician General
December 2018

2.0 Summary of Findings

All figures in this report are not seasonally adjusted.

Table 1 presents a summary of findings for the Index of Mining Production **(IMP)** from the first quarter of 2013 to the third quarter of 2018. This table forms the basis for the discussions under Sub-Section 2.1. Reference, however, will be made to this table and other tables throughout the report.

2.1 Index of Mining Production

The Index of Mining Production stood at 87.1 during the third quarter of 2018, showing a year-on-year decrease of 4.2 percent from 91.0 during the third quarter of 2017. The main contributor to the decrease in the index, was Diamonds, having contributed 4.6 percentage points as shown in **Table 2**.

The quarter-on-quarter analysis shows a decrease of 7.4 percent from the index of 94.0 during the second quarter of 2018 to 87.1 observed in the reference period.

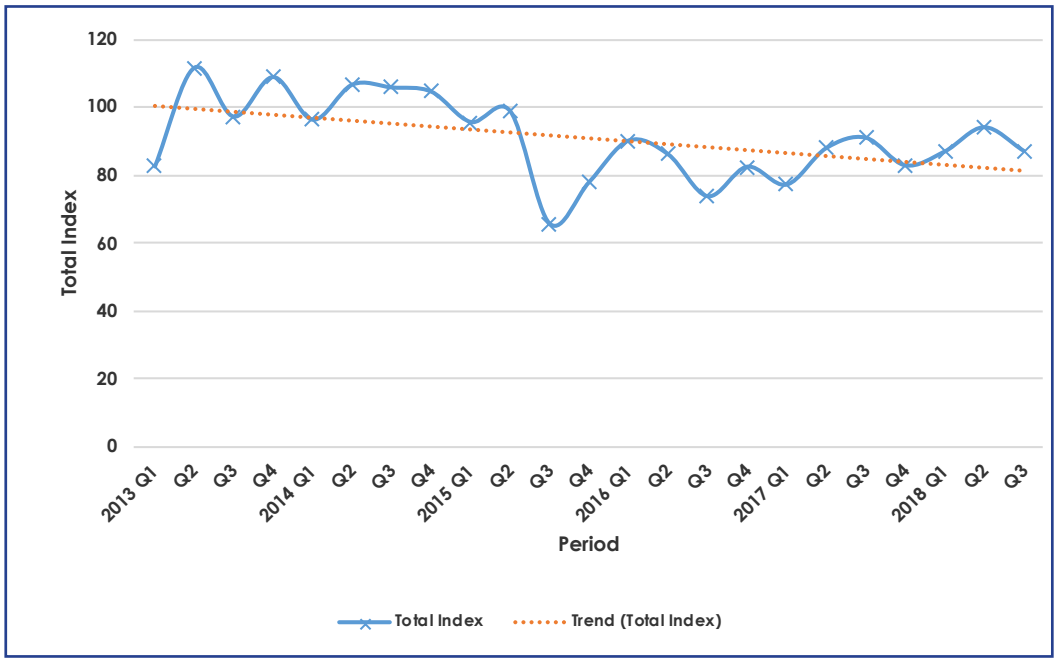
Table 1: Key Figures in the Volume of Mining Production

Base Period : 2013=100			
Period	Index of the physical volume of mining production	Year-on-Year percentage change	Quarter-on-Quarter percentage change
Q1_2013	82.5	(8.7)	(9.7)
Q2_2013	111.6	25.2	35.3
Q3_2013	97.1	38.4	(12.9)
Q4_2013	108.8	19.1	12.0
Q1_2014	96.2	16.7	(11.5)
Q2_2014	106.6	(4.5)	10.8
Q3_2014	105.7	8.9	(0.8)
Q4_2014	104.5	(4.0)	(1.2)
Q1_2015	95.6	(0.7)	(8.6)
Q2_2015	98.7	(7.4)	3.3
Q3_2015	65.6	(37.9)	(33.5)
Q4_2015	77.9	(25.5)	18.7
Q1_2016	90.1	(5.7)	15.7
Q2_2016	86.0	(12.9)	(4.5)
Q3_2016	73.7	12.3	(14.3)
Q4_2016	82.4	5.8	11.8
Q1_2017	77.1	(14.4)	(6.4)
Q2_2017	87.9	2.1	13.9
Q3_2017	91.0	23.4	3.5
Q4_2017	82.8	0.5	(9.0)
Q1_2018	86.9	12.6	4.9
Q2_2018	94.0	7.0	8.3
Q3_2018	87.1	(4.2)	(7.4)

Note: 1. ( ) denotes negative numbers

Figure 1 shows the graphical presentation of the Total Index from the first quarter of 2013 to the third quarter of 2018. The graph shows that despite the fluctuations realised over the period, on average, it can be observed that production has been gradually declining between 2013 and 2018.

Figure 1: Total Index of Mining Production for the First Quarter of 2013 to the Third Quarter of 2018



2.2 Mineral Production

Discussions on mineral production, which compare production during the third quarter of 2018 to the same quarter of 2017, are based on **Table 2** and **Table 5**. **Table 4** provides quarter-on-quarter analysis of the mineral production, for the quarter under review, giving comparison to the preceding quarter.

Diamond production decreased by 4.8 percent during the third quarter of 2018, compared to the same quarter of the previous year. The decline came as a result of planned strategy to reduce bulky production in order to align production with trading conditions. The quarter-on-quarter analysis reflects that diamond production declined by 8.4 percent during the third quarter of 2018 compared to the second quarter of the same year.

Copper in concentrates recorded an increase of 83.8 percent compared to the corresponding quarter of 2017. The quarter-on-quarter comparison shows that production increased by 14.3 percent during the third quarter of 2018 compared to the revised production of the second quarter of the same year. It should be noted that second quarter of 2018 data of the same commodity has been revised and updates included in this report.

Gold production declined by 10.6 percent during the third quarter of 2018 compared to the same quarter of 2017. The quarter-on-quarter analysis shows a decrease of 15.6 percent in the third quarter of 2018 compared to the second quarter of the same year.

Soda Ash production increased by 33.8 percent during the third quarter of 2018, compared to the same quarter of 2017. It is notable that soda ash production has steadily increased over the past three consecutive quarters. The quarter-on-quarter analysis shows that production increased by 87.8 percent during the period under review.

Salt production declined by 31.8 percent during the third quarter of 2018 compared to the same quarter of 2017. The quarter-on-quarter comparison on the other hand, shows an increase of 77.2 percent during the third quarter of 2018 compared to production during the second quarter of 2018.

Coal production increased by 14.4 percent during the third quarter of 2018 compared to production during the same quarter of the previous year. The quarter-on-quarter comparison shows that coal production increased by 0.5 percent during the third quarter of 2018.

Copper-Nickel-Cobalt Matte and Silver recorded zero production during the period under review. The instability and uncertainty of commodity prices affected the operations of the involved mines, therefore finding it difficult to sustain themselves at the current prices, leading to the provisional liquidation of the concerned companies.

Table 2: Index of Mining Production for the latest Quarter by Mineral Groups and Minerals

Base:2013=100					
Mineral	Weights (2013)	Jul-Sep, 2017	Jul-Sep, 2018	Year-on-Year Percentage Change	Contribution (% points) to the Percentage Change in the total Mining Production
Diamonds	**82.5**	105.8	100.7	(4.8)	(4.6)
Copper-Nickel-Cobalt Matte	**8.6**	n.a.	n.a.	n.a.	n.a.
Copper in Concentrates	**5.5**	4.8	8.9	83.8	0.2
Gold	**1.4**	98.3	87.8	(10.6)	(0.2)
Soda Ash	**0.9**	126.1	168.7	33.8	0.4
Salt	**0.5**	117.6	80.2	(31.8)	(0.2)
Silver	**0.4**	n.a.	n.a.	n.a.	n.a.
Coal	**0.3**	156.1	178.6	14.4	0.1
Total	**100**	**91.0**	**87.1**	**(4.2)**	**(4.2)**

NB: 1. The contribution (percentage points) of a mineral to the percentage change in the total mining production is calculated by multiplying the difference in the index for the mineral by the weight of the mineral and then dividing by the previous period's total index.
2. ( ) denotes negative numbers
3. "n.a." signifies data not available/no production during the specified period.

Table 3: Index of the Volume of Mining Production by Mineral Group and Mineral

Base 2013 = 100									
Year\ Weights	Diamonds	Copper-Nickel-Cobalt Matte	Copper in Concentrates	Gold	Soda Ash	Salt	Silver	Coal	Total Index
	82.5	8.6	5.5	1.4	0.9	0.5	0.4	0.3	100.0
2012	89.1	80.5	31.1	114.1	109.1	70.5	n.a.	97.2	**85.3**
2013	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	**100.0**
2014	106.6	67.1	114.0	79.4	117.8	98.9	98.6	114.4	**103.3**
2015	90.0	69.8	32.5	62.4	95.8	71.7	12.4	138.1	**84.5**
2016	90.3	68.2	n.a.	69.0	123.1	76.7	n.a.	125.1	**83.1**
2017	99.2	n.a.	4.4	76.3	99.5	70.9	n.a.	148.1	**84.7**
2012 Q1	92.5	110.1	23.8	134.6	105.9	65.8	n.a.	62.6	**90.4**
Q2	92.4	99.6	22.9	119.8	99.2	78.3	n.a.	60.1	**89.1**
Q3	75.8	25.6	41.0	108.9	129.1	58.2	n.a.	118.8	**70.2**
Q4	95.7	86.9	36.6	93.1	102.1	79.9	n.a.	147.4	**91.4**
2013 Q1	80.5	88.0	94.0	76.6	122.9	97.0	102.3	107.5	**82.5**
Q2	111.7	112.4	115.5	98.5	89	116.8	118.1	74.6	**111.6**
Q3	95.8	107.8	93.2	102.4	112.9	118.6	108	113.8	**97.1**
Q4	111.9	91.9	97.4	122.5	75.2	67.6	71.7	104.1	**108.8**
2014 Q1	101.5	46.8	96.9	96.4	109.0	68.6	73.2	95.0	**96.2**
Q2	110.0	73.4	114.7	74.3	115.6	100.8	88.5	123.9	**106.6**
Q3	109.3	51.6	136.0	84.5	117.3	116.2	135.4	130.6	**105.7**
Q4	105.5	96.5	108.5	62.3	129.5	109.7	97.5	108.3	**104.5**
2015 Q1	99.1	87.6	74.3	51.7	73.4	61.6	49.6	126.9	**95.6**
Q2	104.1	105.2	30.3	49.7	96.9	61.1	n.a.	135.1	**98.7**
Q3	72.7	19.9	14.7	77.9	125.6	106.6	n.a.	154.8	**65.6**
Q4	84.0	66.6	n.a.	70.3	131.2	80.9	n.a.	135.6	**77.9**
2016 Q1	93.9	119.0	n.a.	60.0	117.9	67.3	n.a.	114.4	**90.1**
Q2	91.7	93.4	n.a.	80.9	84.0	56.5	n.a.	93.9	**86.0**
Q3	79.6	60.4	n.a.	64.3	139.3	86.9	n.a.	146.9	**73.7**
Q4	96.1	n.a.	n.a.	70.6	150.9	96.0	n.a.	145.1	**82.4**
2017 Q1	91.3	n.a.	n.a.	46.7	71.9	46.0	n.a.	131.2	**77.1**
Q2	103.3	n.a.	9.8	69.2	62.8	40.6	n.a.	153.8	**87.9**
Q3	105.8	n.a.	4.8	98.5	126.1	117.6	n.a.	156.1	**91.0**
Q4	96.3	n.a.	3.0	90.8	137	79.5	n.a.	151.4	**82.8**
2018 Q1	101.8	n.a.	1.9	78.9	113.2	66.0	n.a.	159.7	**86.9**
Q2	110.0	n.a.	7.8	104.1	89.8	45.2	n.a.	177.7	**94.0**
Q3	100.7	n.a.	8.9	87.8	168.7	80.2	n.a.	178.6	**87.1**

NB: 1. "n.a." Signifies data not available/no production during the specified period,

Table 4: Quarter on Quarter Percentage Change in the Volume of Mining Production by Mineral Group and Mineral

Base 2013 = 100									
Year\ Weights	Diamonds	Copper-Nickel--Cobalt Matte	Copper in Concentrates	Gold	Soda Ash	Salt	Silver	Coal	Total Index
	82.5	8.6	5.5	1.4	0.9	0.5	0.4	0.3	100.0
2012 Q1	15.2	10.8	3.0	(16.0)	(12.7)	(30.6)	n.a.	142.7	**13.1**
Q2	(0.1)	(9.5)	(4.0)	(11.0)	(6.3)	18.9	n.a.	(4.0)	**(1.4)**
Q3	(18.0)	(74.3)	79.1	(9.1)	30.1	(25.6)	n.a.	97.7	**(21.2)**
Q4	26.3	239.3	(10.6)	(14.5)	(21.0)	37.3	n.a.	24.0	**30.2**
2013 Q1	(15.9)	1.3	156.6	(17.7)	20.5	21.4	…	(27.1)	**(9.7)**
Q2	38.7	27.7	22.9	28.6	(27.6)	20.4	15.5	(30.6)	**35.3**
Q3	(14.3)	(4.1)	(19.3)	4.0	26.8	1.5	(8.6)	52.6	**(12.9)**
Q4	16.8	(14.7)	4.5	19.6	(33.4)	(43.0)	(33.6)	(8.6)	**12.0**
2014 Q1	(9.3)	(49.1)	(0.5)	(21.4)	44.9	1.5	2.1	(8.7)	**(11.5)**
Q2	8.4	56.9	18.3	(22.9)	6.0	47.0	20.8	30.5	**10.8**
Q3	(0.7)	(29.7)	18.6	13.8	1.5	15.3	53.0	5.4	**(0.8)**
Q4	(3.4)	86.8	(20.3)	(26.3)	10.4	(5.6)	(28.0)	(17.1)	**(1.2)**
2015 Q1	(6.0)	(9.2)	(31.5)	(17.0)	(43.3)	(43.9)	(49.1)	17.2	**(8.6)**
Q2	5.0	20.1	(59.2)	(3.8)	31.9	(0.7)	(100.0)	6.4	**3.3**
Q3	(30.1)	(81.1)	(51.7)	56.7	29.6	74.4	n.a.	14.6	**(33.5)**
Q4	15.5	235.3	(100.0)	(9.7)	4.5	(24.1)	n.a.	(12.4)	**18.7**
2016 Q1	11.7	78.7	n.a.	(14.7)	(10.1)	(16.9)	n.a.	(15.6)	**15.7**
Q2	(2.3)	(21.5)	n.a.	34.8	(28.8)	(16.0)	n.a.	(18.0)	**(4.5)**
Q3	(13.3)	(35.4)	n.a.	(20.5)	65.9	53.7	n.a.	56.5	**(14.3)**
Q4	20.8	(100.0)	n.a.	9.8	8.3	10.4	n.a.	(1.2)	**11.8**
2017 Q1	(5.0)	n.a.	n.a.	(33.8)	(52.4)	(52.1)	n.a.	(9.6)	**(6.4)**
Q2	13.2	n.a.	n.a.	48.2	(12.7)	(11.8)	n.a.	17.2	**13.9**
Q3	2.4	n.a.	(50.7)	41.9	100.9	190.0	n.a.	1.5	**3.5**
Q4	(9.0)	n.a.	(38.2)	(7.6)	8.6	(32.4)	n.a.	(3.0)	**(9.0)**
2018 Q1	5.7	n.a.	(35.7)	(13.2)	(17.3)	(17.0)	n.a.	5.5	**4.9**
Q2	8.1	n.a.	305.2	32.0	(20.6)	(31.4)	n.a.	11.2	**8.3**
Q3	(8.4)	n.a.	14.3	(15.6)	87.8	77.2	n.a.	0.5	**(7.4)**

Note: 1. ( ) Denote negative numbers
2. " n.a." Signifies data not available/no production during the specified period
3. … data is not necessarily zero, but the figure is not big enough to be measured with the smallest unit

Table 5: Year-on-Year Percentage Change in the Volume of Mining Production by Mineral Group and Mineral

Base 2013 = 100									
Year\ Weights	Diamonds	Copper-Nickel--Cobalt Matte	Copper in Concentrates	Gold	Soda Ash	Salt	Silver	Coal	Total Index
	82.5	8.6	5.5	1.4	0.9	0.5	0.4	0.3	100.0
2012	(10.0)	12.0	40.6	(11.8)	(3.6)	(17.6)	n.a.	84.7	**(7.7)**
2013	12.2	24.2	221.9	(12.4)	(8.3)	41.8	…	2.8	**17.3**
2014	6.6	(32.9)	14.0	(20.6)	17.8	(1.1)	(1.4)	14.4	**3.3**
2015	(15.6)	4.1	(71.5)	(21.4)	(9.4)	(21.5)	(87.4)	20.7	**(18.1)**
2016	0.3	(2.3)	(100.0)	10.5	15.2	(1.1)	(100.0)	(9.4)	**(1.8)**
2017	9.8	(100.0)	…	10.6	(19.2)	(7.6)	n.a	18.4	**2.0**
2012 Q1	15.2	10.8	3.0	(16.0)	(12.7)	(30.6)	n.a.	142.7	**13.1**
Q2	(0.1)	(9.5)	(4.0)	(11.0)	(6.3)	18.9	n.a.	(4.0)	**(1.4)**
Q3	(18.0)	(74.3)	79.1	(9.1)	30.1	(25.6)	n.a.	97.7	**(21.2)**
Q4	26.3	239.3	(10.6)	(14.5)	(21.0)	37.3	n.a.	24.0	**30.2**
2013 Q1	(15.9)	1.3	156.6	(17.7)	20.5	21.4	…	(27.1)	**(9.7)**
Q2	38.7	27.7	22.9	28.6	(27.6)	20.4	15.5	(30.6)	**35.3**
Q3	(14.3)	(4.1)	(19.3)	4.0	26.8	1.5	(8.6)	52.6	**(12.9)**
Q4	16.8	(14.7)	4.5	19.6	(33.4)	(43.0)	(33.6)	(8.6)	**12.0**
2014 Q1	(9.3)	(49.1)	(0.5)	(21.4)	44.9	1.5	2.1	(8.7)	**(11.5)**
Q2	8.4	56.9	18.3	(22.9)	6.0	47.0	20.8	30.5	**10.8**
Q3	(0.7)	(29.7)	18.6	13.8	1.5	15.3	53.0	5.4	**(0.8)**
Q4	(3.4)	86.8	(20.3)	(26.3)	10.4	(5.6)	(28.0)	(17.1)	**(1.2)**
2015 Q1	(6.0)	(9.2)	(31.5)	(17.0)	(43.3)	(43.9)	(49.1)	17.2	**(8.6)**
Q2	5.0	20.1	(59.2)	(3.8)	31.9	(0.7)	(100.0)	6.4	**3.3**
Q3	(30.1)	(81.1)	(51.7)	56.7	29.6	74.4	n.a.	14.6	**(33.5)**
Q4	15.5	235.3	(100.0)	(9.7)	4.5	(24.1)	n.a.	(12.4)	**18.7**
2016 Q1	11.7	78.7	n.a.	(14.7)	(10.1)	(16.9)	n.a.	(15.6)	**15.7**
Q2	(2.3)	(21.5)	n.a.	34.8	(28.8)	(16.0)	n.a.	(18.0)	**(4.5)**
Q3	(13.3)	(35.4)	n.a.	(20.5)	65.9	53.7	n.a.	56.5	**(14.3)**
Q4	20.8	(100.0)	n.a.	9.8	8.3	10.4	n.a.	(1.2)	**11.8**
2017 Q1	(5.0)	n.a.	n.a.	(33.8)	(52.4)	(52.1)	n.a.	(9.6)	**(6.4)**
Q2	13.2	n.a.	n.a.	48.2	(12.7)	(11.8)	n.a.	17.2	**13.9**
Q3	2.4	n.a.	(50.7)	41.9	100.9	190.0	n.a.	1.5	**3.5**
Q4	(9.0)	n.a.	(38.2)	(7.6)	8.6	(32.4)	n.a.	(3.0)	**(9.0)**
2018 Q1	5.7	n.a.	(35.7)	(13.2)	(17.3)	(17.0)	n.a.	5.5	**4.9**
Q2	8.1	n.a.	305.2	32.0	(20.6)	(31.4)	n.a.	11.2	**8.3**
Q3	(8.4)	n.a.	14.3	(15.6)	87.8	77.2	n.a.	0.5	**(7.4)**

Note: 1. ( ) Denote negative numbers
2. " n.a." Signifies data not available/no production during the specified period
3. … data is not necessarily zero, but the figure is not big enough to be measured with the smallest unit

Table 6: Contribution of Each Mineral Group and Mineral to the Year-on-Year Percentage Change in the Volume of Mining Production

Base 2013 = 100									
Year\ Weights	Diamonds	Copper-Nickel--Cobalt Matte	Copper in Concentrates	Gold	Soda Ash	Salt	Silver	Coal	Total Index
	82.5	8.6	5.5	1.4	0.9	0.5	0.4	0.3	100.0
2012	(8.8)	0.8	0.5.	(0.2)	(0.0)	(0.1)	n.a.	0.1	**(7.7)**
2013	10.5	2.0	4.4	(0.2)	(0.1)	0.2	0.5	0.0	**17.3**
2014	5.4	(2.8)	0.8	(0.3)	0.2	(0.0)	(0.0)	0.0	**3.3**
2015	(13.2)	0.2	(4.3)	(0.2)	(0.2)	(0.1)	(0.4)	0.1	**(18.1)**
2016	0.3	(0.2)	(1.9)	0.1	0.2	(0.0)	(0.1)	(0.0)	**(1.8)**
2017	8.8	(7.0)	0.3	0.1	(0.3)	(0.0)	n.a.	0.1	**2.0**
2012 Q1	(0.7)	1.4	0.5	0.4	0.1	(0.0)	n.a.	0.0	**1.6**
Q2	(8.6)	1.2	(0.1)	0.1	(0.0)	0.0	n.a.	(0.0)	**(7.3)**
Q3	(34.7)	1.5	0.8	(0.3)	(0.0)	(0.2)	n.a.	0.1	**(32.9)**
Q4	15.9	(1.3)	0.9	(1.2)	(0.2)	(0.1)	n.a.	0.4	**14.4**
2013 Q1	(11.0)	(2.1)	4.3	(0.9)	0.2	0.2	0.5	0.1	**(8.7)**
Q2	17.9	1.2	5.7	(0.3)	(0.1)	0.2	0.6	0.0	**25.2**
Q3	23.5	10.0	4.1	(0.1)	(0.2)	0.4	0.8	(0.0)	**38.4**
Q4	14.6	0.5	3.6	0.5	(0.3)	(0.1)	0.4	(0.1)	**19.1**
2014 Q1	21.0	(4.3)	0.2	0.3	(0.2)	(0.2)	(0.2)	(0.0)	**16.7**
Q2	(1.3)	(3.0)	(0.0)	(0.3)	0.2	(0.1)	(0.1)	0.1	**(4.5)**
Q3	11.4	(5.0)	2.4	(0.3)	0.0	(0.0)	0.1	0.0	**8.9**
Q4	(4.8)	0.4	0.6	(0.8)	0.4	0.2	0.1	0.0	**(4.0)**
2015 Q1	(2.0)	3.6	(1.3)	(0.6)	(0.3)	(0.0)	(0.1)	0.1	**(0.7)**
Q2	(4.6)	2.6	(4.3)	(0.3)	(0.2)	(0.2)	(0.4)	0.0	**(7.4)**
Q3	(28.5)	(2.6)	(6.3)	(0.1)	0.1	(0.0)	(0.6)	0.1	**(37.9)**
Q4	(17.0)	(2.5)	(5.7)	0.1	0.0	(0.1)	(0.4)	0.1	**(25.5)**
2016 Q1	(4.6)	2.8	(4.3)	0.1	0.4	0.0	(0.2)	(0.0)	**(5.7)**
Q2	(10. 4)	(1.0)	(1.7)	0.4	(0.1)	(0.0)	n.a.	(0.1)	**(12.9)**
Q3	8.6	5.3	(1.2)	(0.3)	0.2	(0.2)	n.a.	(0.0)	**12.3**
Q4	12.8	(7.3)	n.a	0.0	0.2	0.1	n.a.	0.0	**5.8**
2017 Q1	(2.4)	(11.3)	n.a	(0.2)	(0.5)	(0.1)	n.a.	0.0	**(14.4)**
Q2	11.1	(9.3)	0.6	(0.2)	(0.2)	(0.1)	n.a.	0.2	**2.1**
Q3	29.3	(7.0)	0.4	0.6	(0.2)	0.2	n.a.	0.0	**23.4**
Q4	0.2	n.a.	0.2	0.3	(0.2)	(0.1)	n.a.	0.0	**0.5**
2018 Q1	11.2	n.a.	0.1	0.6	0.5	0.1	n.a.	0.1	**12.6**
Q2	6.2	n.a.	(0.1)	0.6	0.3	0.0	n.a.	0.1	**7.0**
Q3	(4.6)	n.a.	0.2	(0.2)	0.4	(0.2)	n.a.	0.1	**(4.2)**

Note: 1. ( ) Denote negative numbers.
2. "n.a." Signifies data not available/no production during the specified period.

3.0 Technical Notes

3.1 Background

Mining activity in Botswana started in the 19th century with the production of Gold by Europeans from the Tati Reefs, which is now the modern Francistown area. However, much of this activity could not be accounted for, despite its significant contribution to the economy at that time. Modern mining in Botswana started with the mining of Diamonds at Orapa in 1971 followed by Copper-Nickel production in 1973 at Selebi Phikwe. Since the early 1980s, the mining industry has been the largest contributor to real Gross Domestic Product (GDP), contributing between 20 and 50 percent.

These mineral contributions enabled the Government to undertake investments in both human and physical infrastructure development over time. Even though the mining sector's contribution to GDP has been below 25 percent since the 2009 recession, available data indicates that the sector still leads in terms of value added contribution to GDP, according to the quarterly GDP reports produced by Statistics Botswana. Despite its great contribution to Botswana's GDP, the mining industry is capital intensive and accounts for less than 5 percent of employment in the private sector.

With such a significant contribution to the GDP, and the national economy, the need for a measure of the change in the production of minerals in Botswana cannot be over emphasised. The index of the physical volume of mining production is such a measure that provides a relative change over time in mining production. The IMP can also be used as a deflator to calculate the GDP at constant prices.

3.2 Data collection

A mining production survey is carried out by the Department of Mines at the Ministry of Minerals, Energy and Water Resources, covering all mining establishments operating in the country. After the completion of data collection, the Department of Mines provides the data to Statistics Botswana. Following international standards and guidelines, Statistics Botswana cleans the data, produces statistical tables and produces reports which are then packaged and disseminated to users. The results of the survey are used to calculate the volume of mining production indices on a quarterly basis and subsequently to estimate GDP, also on a quarterly basis.

3.3 Scope of the survey

The survey covers all mining establishments conducting activities relating to the extraction of minerals such as Diamonds, Copper-Nickel-Cobalt Matte, Copper in Concentrates, Gold, Soda Ash, Salt, Silver, Coal, Semi-precious stones and the quarrying of building materials. The activities are classified according to the International Standard of Industrial Classification of all Economic Activities, ISIC Rev 4, and the Central Product Classification (CPC) Version 2.

4.0 Concepts, definitions and methods

4.1 Index of the volume of mining productions

The index of the volume of mining production is a ratio that indicates the increase or decrease of a magnitude. The index form is used not only for intertemporal comparisons, but for comparisons between countries.

The IMP is an important macro-economic indicator which monitors progress and fluctuation of the mineral sector production in the economy. The Index is also known to be an effective tool that measures current production, which indicates relative changes over time in the physical volume of mining production.

4.2 Base Period

The base period, usually a year, is the period against which other periods are compared and whose values provide the weights for an index. The base period used in this brief, is 2013 and it is set at 100.

4.3 Index weighting

The weight of the mineral group is the ratio of the estimated value of production of a mineral group to the total estimated value of production of the mining industry. The weight of a mineral group reflects the importance of the mineral group in the total mining industry. The relative importance of various mineral groups is different and these differentials need to be reflected while measuring the performance of the entire mining sector.

4.4 Seasonal Adjustment

Seasonal adjustment is a means of removing the estimated effects of normal seasonal fluctuations and typical calendar effects from the series so that the effects of other influences on the series can be more clearly recognised. Seasonal adjustment does not aim to remove irregular or non-seasonal influences which may be present in any particular period.

The data produced are not seasonally adjusted. However, there is a further scope of producing and disseminating an additional seasonally adjusted series only when there is a clear statistical evidence and economic interpretation of the seasonal/calendar effects.

4.5 Year-on-Year Percentage Change

Year-on-Year percentage change in a variable for any given period is the rate of change expressed over the same period.

4.6 Quarter-on-Quarter percentage change

Quarter-on-Quarter percentage change in a variable for any given period is the rate of change expressed over the previous quarter.

4.7 Index Contribution (percentage points)

The contribution (percentage points) of a mineral group or mineral to the percentage change in the total mining production for a given period is calculated by multiplying the difference in the index for each mineral group or mineral by the weight of the mineral group or mineral and then dividing by the previous period's total index. It indicates the extent to which each mineral group affects the overall growth of mining production.

4.8 Calculation of the Index of Mining Production

To calculate the evolution of physical volume of mining production on a quarterly basis, a Laspeyres indicator, base year 2013=100, was used. The index is calculated as the weighted arithmetic mean of the production relatives in respect of selected items. The weighted average is done to measure the importance of various mineral groups in the mining sector when calculating the comprehensive growth rate of the sector.

$$I = \frac{\sum R_i * W_i}{\sum W_i}$$

Where; I is the index, R_i is the production relative of item ***i*** and W_i is the weight allocated to item i

The production relative ***(R_i)*** of the ***i^{th}*** item for the quarter has been calculated by using the formula:

$$R_i = \frac{P_{ic}}{P_{i0}} * 100$$

Where P_{ic} is the production of the ith item in the current quarter and P_{i0} is the production of the ***i^{th}*** item in the base year.

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